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I, LEANNE MYNOTT, MANAGER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2003906140 for a patent by SIMON JEREMY SKIRROW as filed on 07 November 2003.



WITNESS my hand this
Twenty-second day of November 2004

A handwritten signature in dark ink, appearing to be "LM", written over a horizontal line.

LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT
AND SALES

P/00/009 25.5.91
Regulation 3.2

AUSTRALIA

Patents Act 1990

PROVISIONAL SPECIFICATION

Invention Title:

SURFACES HAVING HIGH COEFFICIENT OF FRICTION

The invention is described in the following statement:

SURFACES HAVING HIGH COEFFICIENT OF FRICTION

FIELD OF INVENTION

This invention relates to surfaces of materials, such as treated materials, e.g. leather, and is particularly, though not exclusively, concerned with materials to be used in athletic footwear used in soccer or other sports, which require kicking and/or dribbling of a ball with the wearer's fee. Other such base materials would be produced either synthetically or naturally.

BACKGROUND AND RELATED ART

People experience the problem of a lack of grip, which creates issues of poor game play by lack of control e.g. mis-kicking a soccer ball or dropping a catch. There are many designs to try to overcome this issue.

Soccer shoes are worn by the player to dribble, kick and pass a ball. In each function, it is beneficial for the wearer to be able to handle and control the ball easily and effectively with the soccer shoe. It is also beneficial to have a soccer shoe that enables the wearer to impart spin and offer increased power transfer to the ball, as it is kicked by the player. Further, a soccer shoe that improves a wearer's ability to control and kick the ball as environmental conditions become adverse, such as when it is cold, wet and/or muddy, is crucial to a wearer's consistent performance.

In the light of the above, numerous attempts have been made over the years to incorporate into a soccer shoe some type of ball handling surface attached to the shoe upper that provides a wearer with better grip and purchase of a ball. In U.S. Pat. No. 3,191,321 of Brutting, rubber projections were inserted through holes in
5 the toe portion and medial and lateral vamp portions of the soccer shoe upper to form a ball control surface. This arrangement attempted to address problems of prior shoes of this type i.e., unsatisfactory shape of projections, construction and method of securing the projections to the upper. Whereas the rubber projections of the shoe of U.S. Pat. No. 3,191,321 are such as to perhaps improve ball
10 contact and control, they may have the adverse effect of dampening a wearer's power kick due to the compressibility of the material contacting the ball.

The design of the soccer shoe in U.S. Pat. No. 5,437,112 of Johnston includes rubber formations applied over flat and/or concave ball contact areas. The
15 effectiveness of the ball contact areas of U.S. Pat. No. 5,437,112 is premised on the "squaring-off" of the toe box so that the shoe has increased surface area on the inner medial and lateral shoe vamp. The rubber formations on the ball control surface are comprised of either thinner, flexible rubber to provide flexibility and feel to the wearer for improved dribbling and ball control or of rubber of
20 sufficient thickness to remain stable for power kicking. In order to get both effects in one shoe; it is necessary for a wearer to secure a harder, thicker kicking attachment to a "dribbling" shoe. Thus, the design of the shoe does not readily accommodate a soccer player's need for a soccer shoe that will aid the

wearer in dribbling and controlling the ball as well as power kicking and passing the ball.

Accordingly, what is needed is a soccer shoe which incorporates a ball control
5 system that includes a means to provide adequate dribbling and controlling
features to the wearer and means of applying or increasing power or influence
over the ball during kicking and passing. In addition, the ball control system must
be integrated into the soccer shoe in such a manner as to not impede a player's
speed by being too heavy or cumbersome. Thus the performance of the wearer
10 depends on their ability to apply forces to an object such as a ball, which forces
have a tangential or transverse component.

STATEMENT OF THE INVENTION

According to one aspect of the present invention, there is provided a quantity of
15 material, a surface of which is formed with, or to which is applied a coating
having a higher coefficient of friction than the surface of the material without said
coating.

Preferably the surface of the material is porous or has cavities or depressions
20 into which said coating penetrates to effect a bond.

Desirably said material is leather.

Preferably the coating is made from or includes a highly plasticised polyvinylchloride (PVC), a soft polyurethane, silicone rubber, plasticised PVC/polyvinyl acetate (PVA), copolymer or composites thereof.

- 5 According to another aspect of the invention, there is provided a sheet of material, a surface of which is formed with, or to which is applied a coating having a higher coefficient of friction than the surface of the sheet of the material without said coating.
- 10 According to a further aspect of the present invention there is provided a sporting article made from or including a sheet of the abovementioned material.

Conveniently, the sporting article is an article of footwear.

- 15 Preferably the coating is applied to the external surface of the footwear and especially to the front part thereof.

Advantageously the coating includes 25-55% by weight of polyvinyl chloride or PVC/PVA copolymer and 75-45% by weight of a plasticiser.

20

The polymer mix may be applied at levels between 5 and 10 grams per square foot area.

According to yet another aspect of the present invention, there is provided a glove, an article of footwear or an article of apparel or sports equipment made wholly or partially of a highly plasticised PVC polymer or PVC/PVA copolymer.

- 5 Conveniently, there is 25-55% by weight of PVC or PVC/PVA copolymer and 75-45% by weight of plasticiser.

DESCRIPTION

One object of this invention is to treat the surface of the fibre structure of a material with a high coefficient of friction gripping material that has high grip characteristics. That is, that it is comprised of a film of gripping material that does not have a tacky/sticky handle. If dust or soiling occurs, it can simply be washed or wiped over to regenerate the gripping characteristics.

- 10 The formed film of the composition is almost rubbery in nature and in addition its surface has an extremely high coefficient of friction relative to all commonly occurring materials, e.g. leather, natural or synthetic rubber and other plastic or polymeric type materials. No special surface texturing or finish is require to achieve this property.

20

The treatment may be made for example from highly plasticised polyvinylchloride (PVC), a soft polyurthane, silicone rubber, plasticised PVC/Polyvinyl acetate (PVA) copolymer or composites thereof. An example of a formulation is as

follows: a polymeric material containing 25-55% by weight of polyvinyl chloride and 75-45% by weight of a plasticiser, preferably a secondary plasticiser which exudes to the surface of the material to such an extent that the material surface is covered by a thin, self-regenerating film of plasticiser. Suitable plasticisers are

5 a modified polyester, a glycol ester of a straight chain di-basic acid or a monomeric ester of a straight chain dibasic acid with a C 4 -C 14 monohydric alcohol, e.g. monomeric adipates. Optionally a stabiliser may be included, e.g. a mixture of zinc and calcium stearates dispersed in epoxidised soya bean oil.

10 The plasticiser is preferably a secondary plasticiser for PVC. Plasticisers for PVC resins can be divided into three classes:

1. Primary or fully compatible plasticisers
2. Secondary or partly compatible plasticisers
- 15 3. Extenders

Primary or fully compatible plasticisers are tightly bound to the resin and can migrate only very slowly within the plasticised resin mass.

20 Secondary or partly compatible plasticiser are less tightly bound and can therefore migrate within the mass from a zone of higher plasticiser concentration to a zone of lower plasticiser concentration. They can also exude to the surface

of the plasticised resin. Certain mixtures of primary plasticiser and extenders may also be used as these combinations can behave as secondary plasticisers.

5 Extenders are loosely bound and can migrate freely within the mass and exude to a marked degree.

10 The surface of the material, e.g. leather, must be coated with a plasticised PVC or PVC/PVA resin. This makes the surface softer and very grippy. To ensure that such a film is present even after repeated cleaning, it is preferable for the plasticiser to be of a secondary nature as stated above. This is due to the case that fresh plasticiser can migrate to the surface. The secondary plasticiser is preferably such that the rate of loss of plasticiser is very low so that only a very thin film is present on the surface. In this case no damage or indeed mess is caused by the exudation of excessive quantities of plasticiser.

15

In addition to the PVC and plasticiser, one or more stabilisers may also be present in the resin mix. One such stabiliser is a mixture of calcium and zinc stearate (in which the ratio is preferably 5:1 to 20:1). This may be used in the form of a dispersion in epoxidised soya bean oil, which also acts as a stabiliser.

20 The proportion of the dispersion present is preferably 0.5-2.0% by weight of the whole mixture.

Various pigments may also be added if colouration is so desired. For a grey coating, the pigment may for example be carbon black. Other colours are achieved from commercial pigment ranges from companies such as Clariant GmbH.

5

The material, e.g. leather, that has been coated can be cleaned with an aqueous solution of conventional detergent, and then removing excess water with a sponge. This cleaning action allows fresh secondary plasticiser to migrate and thus the surface film is very quickly regenerated. This is also the reason why the
10 resin mix contains sufficient plasticiser, in fact as much as possible, but without making it excessively soft. The preferred proportion is about 66% by mass.

It is possible to rejuvenate the coating by steeping in a bath of plasticiser under heat, allowing the film to absorb and take up more plasticiser.

15

Also it is worth noting that the material to be coated can sometimes require a primer treatment to gain sufficient adhesion characteristics for the final article.

The coating can be produced by mixing the PVC with the plasticiser (also known
20 as a plastisol) then with some stabiliser, and having this coated onto the surface of the material. This can be achieved by such methods as rollercoating, for leather application, or curtain coating for other textile type materials.

The amount applied will relate to the thickness of the coating – typically a coating of between 5-10 grams per square foot is acceptable, but more or less can be applied. Once applied the resin mix requires curing at temperatures for example in the region of 155 degrees Centigrade for a period of time. This time is
5 determined by the amount of resin mix applied, by generally 60 seconds is sufficient.

DATED THIS SEVENTH DAY OF NOVEMBER 2003

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SIMON JEREMY SKIRROW

by his Patent Attorneys

Pipers Patent and Trade Mark Attorneys